

GBEI Wastewater Research that Led to the British Columbia Organic Matter Recycling Regulation

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Abstract

Wastewater treatment facilities in the Georgia Basin generate more than 20,000 dry tonnes of biosolids each year. As treatment facilities are upgraded and the population within the region increases, biosolids volumes are mounting.

The BC *Organic Matter Recycling Regulation* (OMRR) was enacted on February 5, 2002. The regulation contains standards for the management of wastewater residuals (biosolids), resulting from the municipal wastewater treatment process, for use as a soil amendment or fertilizer. The regulation allows reuse as an alternative to incineration or landfills. Together, the Georgia Basin Ecosystem Initiative (GBEI) and the BC Ministry of Water, Land and Air Protection funded four important studies that led to this initiative. These were:

- The Georgia Basin Biosolids Inventory and Mercury and Dioxins and Furans Characterization.
- Reducing Contaminant Sources to Municipal Wastewater Treatment Biosolids.
- Potential for Exposure to Polychlorinated Dibenzo-*p*-dioxins and Dibenzo-furans when Recycling Sewage Biosolids on Land.
- Best Management Practices Guidelines for Biosolids applied to land.

OMRR requires that the process of recycling organic material adhere to performance-based standards related to the use of the material—be that as a retail fertilizer, ingredient in a soil product or soil amendment in restoration and reclamation activities. The changes in the composting and recycling regulatory framework have promoted contaminant reduction, reduced incineration and landfilling and facilitated the recycling of organic amendments.

The following are summaries of the four GBEI-funded projects that played an important role in the development of B.C.'s OMRR:

Georgia Basin Biosolids Inventory and Mercury and Dioxins and Furans Characterization: November 1999

Prepared by: **Sylvis Environmental**

This inventory calculates the amount of biosolids produced within the Georgia Basin each year and analyses mercury and polychlorinated dibenzo-*p*-dioxins/polychlorinated dibenzofurans levels and trends for Georgia Basin biosolids.

The study reports that an estimated 24,246 dry tonnes of biosolids were produced in the Georgia Basin in 1998.

The study reports on the concentration of PCDD/Fs in biosolids collected from eight different Wastewater Treatment Plants within the basin and these are compared from previous analyses obtained in BC and results cited in the literature.

To characterize the concentration of mercury in biosolids generated in the Georgia Basin for the inventory, samples were collected from 16 different wastewater treatment plants. These were also compared with typical biosolids analyses obtained from previous analyses as cited in the literature.

All Georgia Basin biosolids PCDD/F concentrations analyzed in this study were below the 100 pg⁻¹ I-TEQ limit for biosolids to be applied to land in Germany; however several WWTP biosolids had elevated concentration of specific congeners and isomers—indicating possible sources of contamination. The study also indicated that mercury content in Georgia Basin biosolids is declining over time.

Reducing Contaminant Sources to Municipal Wastewater Treatment Biosolids: Dioxins/Furans and Mercury: June 2001

Prepared by: **Doug A. Bright**

This report provides source control guidelines for municipal wastewater inputs, specifically for substances containing mercury and polychlorinated dibenzo-p-dioxins/polychlorinated dibenzofurans.

There is a strong interest within the Georgia Basin ecosystem in practices that limit or curtail inputs of persistent and bio-accumulative contaminants. Both the liquid effluents and solid wastes resulting from wastewater treatment have the potential to act as a transport vehicle for contaminants from source activities into terrestrial and aquatic environments.

A reduction in contaminant inputs not only helps protect the receiving environment, it removes a potential barrier to the beneficial use of either biosolids as a fertilizer or the use of reclaimed water. This has the potential to reduce undesirable disposal practices such as sewage sludge incineration. Disposal in water or diversion to landfills

The scope of this study included not only sanitary sewer inputs to municipal wastewater treatment plants but also storm sewer and other inputs that directly contribute to treatment plant input or collection, storage, and treatment lagoons from which either biosolids may be obtained or effluent discharged.

Guidance Document: Potential for Exposure to Polychlorinated Dibenzo-p-dioxins/ Polychlorinated dibenzofurans when Recycling Sewage Biosolids on Agricultural Land: April 26, 2002

Prepared by: **K. Rideout, K. Teschke and S. Varughese**

The purpose of this review was to develop a set of recommendations to assist British Columbia medial health officers in assessing whether the application of biosolids to various types of agricultural lands would result in increased exposure to PCDD/Fs. An extensive literature search was carried out to produce this report.

The report showed that data that examined the relationship between dioxin and furan levels in soil and plant foods were limited. The report indicated that most studies used highly contaminated soils with much higher levels and dioxins and furans than would be found in agricultural land treated with biosolids. The evidence reviewed in the report indicated a weak positive relationship between soil and plant contamination levels in unpeeled root crops, leafy vegetables, tree fruits, and hay, and little or no associations for peeled root crops peas, and beans, grass, or herbs. Stronger relationships were observed for plants of the cucumber family. The report states that at PCDD/F concentrations associated with biosolids application, the expected increase in plant concentration would be minimal.

The report also concluded that there was very little data available to assess the effect of dioxins and furans in land-applied biosolids on the contamination levels in animal tissues and cow's milk.

Best Management Practices Guidelines for the Land Application of Managed Organic Matter in British Columbia: June 2002

Prepared by: **R. McDougall, M.D. Van Ham and M.J. Douglas**

The guidelines were prepared to provide guidance to professionals preparing Land Application Plans and as a source of related information on the best management and use of biosolids.

These guidelines provide Best Management Practices (BMP) that ensure that the land application managed organic matter meets the criteria set out in the Organic Matter Recycling Regulation; that biosolids and compost applications do not cause pollution or adversely affect the safety of the public. The guidelines are based on 'beneficial use' of managed organic matter as they are most appropriately managed as a nutrient source not a waste material.

The Organic Matter Recycling Regulation charges a registered professional with the responsibility of evaluating sites for managed organic matter use, accurately determining application rates and ensuring that there are no adverse impacts on human health and the environment.

The guidelines will be updated frequently as we increase our knowledge and gain more experience in biosolids and compost use.